

REMARKS

Claims 1-5 are pending in this application. Claim 1 has been amended in several particulars for purposes of clarity and brevity that are unrelated to patentability and prior art rejections in accordance with current Office policy, to further define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application. Accordingly, entry of the foregoing amendments is proper under 37 C.F.R. §1.116(b) because those amendments simply respond to the issues raised in the final rejection, no new issues are raised, no further search is required, and the foregoing amendments are believed to remove the basis of the outstanding rejections and to place all claims in condition for allowance.

The drawings (FIGs. 1 and 3) have been corrected to highlight the slot (14) separating W2 armature winding and U3 armature winding consistent with the disclosure. A Letter to the Office Draftsman accompanies this response. Indication in subsequent Office correspondence of the acceptance to the drawing corrections proposed in the Letter, is requested to enable Applicants to timely arrange for the corrections to be made prior to the date for payment of any issue fee.

Claims 1-5 have been rejected under 35 U.S.C. §112, 2d ¶, as being indefinite. In particular, the Examiner asserts that the phrase "whether a space on a side face of a back yoke portion of said stator core" makes no sense and that the phrase "and an other with said second armature winding" is indefinite. In response thereto, base claim 1 has been amended to clarify that the "coil end portions of said first, second and third armature windings are arranged **within** a space on a side face of a back yoke portion (see 1a, FIG. 1) of said stator core (see 1, FIG. 1)" so that "one of said second armature winding and said third armature winding is arranged in

an outer peripheral side of said first armature winding" and "the other one of said second armature winding and said third armature winding is arranged in an inner peripheral side of said first armature winding." As amended, base claim 1 clearly defines the arrangement of the "coil end portions of said first, second and third armature windings" and which of the second or third armature winding is arranged in either an inner peripheral side or an outer peripheral side of the first armature winding. In view of this explanation, Applicants respectfully request that the rejection of claims 1-5 be withdrawn.

Claims 1 and 3-4 have been rejected under 35 U.S.C. §102(b) as being anticipated by Broadway, U.S. Patent No. 3,673,477. In support of the rejection of base claim 1, the Examiner asserts that Broadway '477 teaches a motor stator comprising:

"a stator core (not shown, with slots 1-36, Fig. 1C) having an even number of slots (eight) per pole per phase; and three-phase armature windings A/B/C contained in said slots (Fig. 1C), said armature windings being wound in a single layer distributed winding (Fig. 1C), wherein one of said slots arranged between two of said slots containing a first armature winding (e.g., slots 1 and 8 containing first armature winding phase A) contains a second armature winding for a phase different from a phase of said first armature winding (slot 3 containing second armature winding phase -C), and one of said slots arranged between said two of said slots containing said first armature winding contains a third armature winding (slot 2 containing third armature winding phase -C) for a phase equal to the phase of said second armature winding, wherein one of said second armature winding and said third armature winding is arranged in an outer peripheral side of said first armature winding A (-C in slot 3 is in the "upper layer" Fig. 1C), and the other one of said second armature winding and said third armature winding is arranged in an inner peripheral side of said first armature winding A (-C in slot 2 is in the "lower layer" Fig. 1C)."

Also in support of this rejection, the Examiner asserts that "the coils ends of the coils in Broadway ['477] are arranged at the side faces of the yoke portions".

However, there is no showing or referencing back to specific portion(s) of Broadway

'477 to support this assertion.

The rejection is respectfully traversed for reasons discussed herein below.

Independent claim 1 expressly defines a motor stator comprising:

a stator core having an even number of slots per pole per phase; and
armature windings contained in said slots, said armature windings being wound in a single layer distributed winding, wherein:
one of said slots arranged between two of said slots containing a first armature winding contains a second armature winding for a phase different from a phase of said first armature winding,
one of said slots arranged between said two of said slots containing said first armature winding contains a third armature winding for a phase equal to the phase of said second armature winding, and
coil end portions of said first, second and third armature windings are arranged within a space on a side face of a back yoke portion of said stator core so that one of said second armature winding and said third armature winding is arranged in an outer peripheral side of said first armature winding, and the other one of said second armature winding and said third armature winding is arranged in an inner peripheral side of said first armature winding.

In other words, base claim 1 requires that the number of slots per pole per phase must be **even**. For example, the number of slots may be **two** (2) shown in an embodiment of FIG. 1, or alternatively, **four** (4) shown in an embodiment of FIG. 5 of Applicants' disclosure. In addition, between the two slots, for example, slot #5 and slot #8, shown in FIGs. 1 and 3, containing a first armature winding (U1), one slot must contain a second armature winding (V1 or W1) and the other slot must contain a third armature winding (W1 or V1). In addition, coil end portions of the first, second and third armature windings (U1, V1 and W1) must be arranged within a space on a side face of a back yoke portion 1a of a stator core 1, as shown in FIGs. 1 and 3, so that one of the second and third armature windings (V1 and W1) is arranged in an outer peripheral side of the first armature winding (U1) and the other one of the same windings (V1 and W1) is arranged in an inner peripheral side of the first armature winding (U1).

This way the individual windings (U1, V1, W1, for example, as shown in FIGs. 1 and 3) are **not** overlapped as typically associated with conventional motor designs shown in FIG. 10(b) in which the dimension H2 of the coil end portions of the windings (U1, V1 and W1) in an axial direction is large. Instead, the individual windings (U1, V1, W1, for example, as shown in FIGs. 1 and 3) are interweaved and packed (arranged in a spaced near the side face of the back yoke) as shown in FIG. 10(a) so as to reduce the dimension H2 of the coil end portions of the windings (U1, V1, W1). As a result, the thickness of the rotary electric machine can also be reduced.

In contrast to Applicants' base claim 1, Broadway '477 discloses a single-layer windings for three-phase alternating current induction motor. According to Broadway '477, there are several arrangements of a single-layer pole-amplitude modulation (PAM) winding, using either diamond or concentric coils.

There is **no** disclosure anywhere from Broadway '477 of Applicants' claimed "**even** number of slots per pole per phase" as shown, for example, **two** slots per pole per phase shown in FIG. 1, or alternatively, **four** slots per pole per phase as shown in FIG. 5 of Applicants' disclosure.

Nevertheless, the Examiner seems to equate the "coil-pitch" as disclosed by Broadway '477 as Applicants' claimed "**even** number of slots per pole per phase". This is incorrect. The "coil-pitch" according to Broadway '477 refers to the length of the individual coil, and does not correspond to Applicants' claimed "even number of slots per pole per phase". Moreover, according to Broadway '477, all arrangements of the single-layer PAM winding, using either diamond or concentric coils, use the "coil-pitch" equals to an odd number of slots. Specifically, on column 2, lines 36-37, Broadway '477 teaches that "the **coil-pitch must clearly be equal to an odd**

number of slots. For example, in FIG. 1B, Broadway '477, on column 2, lines 57-58, describes an example of a coil-pitch of 5 slots or 7 slots. In another example, on column 3, lines 59-60, Broadway '477 discloses that "the coil-pitch can be 5, 7 or 9 slots."

Again, there is **no** disclosure anywhere from Broadway '477 of Applicants' claimed "**even** number of slots per pole per phase" as expressly defined in base claim 1.

Secondly, there is **no** disclosure anywhere from Broadway '477 of Applicants' claimed limitation that between the two slots, for example, slot #5 and slot #8, shown in FIGs. 1 and 3, containing a first armature winding (U1), one slot must contain a second armature winding (V1 or W1) while the other slot must contain a third armature winding (W1 or V1).

Lastly, there is **no** disclosure anywhere from Broadway '477 of Applicants' claimed limitation that the "coil end portions of the first, second and third armature windings" (U1, V1 and W1) must be "arranged within a space on a side face of a back yoke portion" (see 1a of the stator core 1, shown in FIGs. 1 and 3), "so that one of the second and third armature windings (V1 and W1) is arranged in an outer peripheral side of the first armature winding (U1) and the other one of the same windings (V1 and W1) is arranged in an inner peripheral side of the first armature winding (U1)" as expressly defined in base claim 1.

In fact, Broadway '477 describes that if the diamond winding shown in FIG. 1C is rearranged to give a concentric winding as shown in FIG. 2, the three windings A, B and C will be arranged such that one phase will overlap on the other phase which will suffer the same problem as identified in the background of Applicants' disclosed invention, that is, the dimension of the coil end portions of the windings A,

B and C in an axial direction will be large and thick.

The rule under 35 U.S.C. §102 is well settled that anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. In re Paulsen, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); In re Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Those elements must either be inherent or disclosed expressly and must be arranged as in the claim. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); Verdegall Bros., Inc. v. Union Oil Co., 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). The limitations required by the claims cannot be ignored. See In re Wilson, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970). All claim limitations, including those which are functional, must be considered. See In re Oelrich, 666 F.2d 578, 212 USPQ 323 (CCPA 1981). In other words, all words in a claim must be considered in deciding the patentability of that claim against the prior art. Each word in a claim must be given its proper meaning, as construed by a person skilled in the art. Where required to determine the scope of a recited term, the disclosure may be used. See In re Barr, 444 F.2d 588, 170 USPQ 330 (CCPA 1971).

The corollary of the rule under 35 U.S.C. §102 is that absence from the reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 230 USPQ2d 81 (Fed. Cir. 1986).

In the present situation, Broadway '477 fails to disclose and suggest the many features of Applicants' base claim 1 and its dependent claims 3-4. Therefore, Applicants respectfully request that the rejection of claims 1 and 3-4 be withdrawn.

On pages 5-6 of the final Office Action dated on October 29, 2002, the Examiner argues that somehow the three phases A-C of Broadway '477 are

arranged to satisfy Applicants' claimed relationship. Again, no direct reference to any specific portion of Broadway '477 is made to whether in the two slots, for example, slot #5 and slot #8, shown in FIGs. 1 and 3, containing a first armature winding (U1), one slot must contain a second armature winding (V1 or W1) while the other slot must contain a third armature winding (W1 or V1). Again no direct reference to any specific portion of Broadway '477 is made as to whether the "coil end portions of the first, second and third armature windings" (U1, V1 and W1) must be "arranged within a space on a side face of a back yoke portion" (see 1a of the stator core 1, shown in FIGs. 1 and 3), "so that one of the second and third armature windings (V1 and W1) is arranged in an outer peripheral side of the first armature winding (U1) and the other one of the same windings (V1 and W1) is arranged in an inner peripheral side of the first armature winding (U1)"

The Examiner further argues that, "if the coils were arranged as shown in applicant's Fig. 10(b), as applicant asserts, each coil end would have to cross over another at some point, when viewed along the axial; however, this would result in a multi-layered winding." Actually, FIG. 10(b) shows a situation in the conventional motors as set forth in Broadway '477, where the coil end portions of individual windings (U, V and W) are arranged with one phase overlapped another phase, resulting in a large or thick dimension H2 of projected coils portions. In contrast to FIG. 10(b), Applicants' claim 1 is intended to reduce the projected dimension of the individual windings.

In view of this explanation and the absence of Applicants' claimed features as expressly defined in base claim 1, Applicants respectfully request that the rejection of claims 1 and 3-4 be withdrawn.

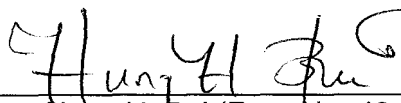
Claim 2 has been rejected under 35 U.S.C. §103 as being unpatentable over Broadway '477 in view of Kakutani, U.S. Patent No. 6,141,865 for reasons stated on page 4 of the final Office Action. Likewise, claim 5 has been rejected under 35 U.S.C. §103 as being unpatentable over Broadway '477 in view of Auinger, U.S. Patent No. 4,127,787 for reasons stated on pages 4-5 of the final Office Action. Since these rejections are predicated upon the correctness of the rejection of base claim 1, Applicants respectfully traverse these rejections for the same reasons discussed against the rejection of base claim 1.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

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Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend claim 1, as follows:

1. (Twice Amended) A stator comprising:

a stator core having an even number of slots per pole per phase; and

armature windings contained in said slots, said armature windings being wound in a single layer distributed winding, wherein:

one of said slots arranged between two of said slots containing a first armature winding contains a second armature winding for a phase different from a phase of said first armature winding, and

one of said slots arranged between said two of said slots containing said first armature winding contains a third armature winding for a phase equal to the phase of said second armature winding, and

coil end portions of said first, second and third armature windings are arranged ~~whether~~ within a space on a side face of a back yoke portion of said stator core so that one of said second armature winding and said third armature winding is arranged in an outer peripheral side of said first armature winding, and ~~an other with~~ the other one of said second armature winding and said third armature winding is arranged in an inner peripheral side of said first armature winding.